



US Army Corps  
of Engineers  
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# DEBRIS QA FIELD GUIDE

# Debris Quality Assurance Field Guide



Quality Assurance (QA) team members have these responsibilities for ensuring Quality Management for Debris Removal projects. As such, the QA role is an important part of the Quality Assurance Program for the contract work.

The purpose of this guide is to provide Debris Mission Quality Assurance Personnel with a ready reference for addressing more common situations arising in Debris Removal and Reduction Operations. This guide is not all-inclusive for every situation that may be encountered. When situations arise that are outside the scope of this document, or in conflict with mission-specific guidance, QA personnel should immediately contact their Quality Assurance Supervisor (QAS) for resolution.

## **SAFETY**

No responsibility is more important to the success of the mission than the responsibility to work safely and implement safety policies and procedures into Quality Assurance work.

**REMEMBER** 

**Nothing** in the debris management operation is worth risking an injury or accident.



## Notes

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## 1 General Information

### ▶ 1.1 Corps of Engineers/FEMA Relationship

The National Response Plan assigns 15 specific Emergency Support Functions (ESFs) to various federal agencies and the Red Cross. The USACE is assigned ESF #3, Public Works and Engineering. Under this ESF, FEMA may give the USACE Mission Assignments (MA) for work such as debris removal and reduction. When this occurs, the USACE is responsible to FEMA for Mission Execution consistent with the applicable laws, policies, and procedures. FEMA becomes the USACE's client and will ultimately reimburse the USACE for eligible work accomplished in the MA. The USACE works for and under the direction of FEMA, not the individual municipality (applicant) or the general public.



### ▶ 1.1 Corps of Engineers/Contractor Relationship




To accomplish the debris removal and reduction missions assigned to the USACE by FEMA, the USACE uses contracts with private firms to perform many or all of the required services. In most situations, these contracts are pre-positioned with contractors assigned to many regions of our country. When activated, these pre-positioned contracts facilitate fast response with pre-qualified firms to accomplish the assigned debris work. The USACE is dependent on contractors for the capability to handle the large debris removal and reduction operations. The contracts and the USACE policy prescribe a partnering relationship with the contractors. Quality Assurance personnel are charged to maintain a professional and respectful relationship with the contractor's personnel and crews. Without contractor partnership, the USACE could not successfully execute Mission Assignments for debris work.




### ▶ 1.3 QA and QAS Roles and Responsibilities

Quality Assurance (QA) personnel report to and are supervised by Quality Assurance Supervisor (QAS) personnel. The QAS responsibilities include:

- Assigning work
- Assuring resources are available for mission accomplishment in a safe manner
- Providing advice or resolving unique or controversial issues
- Coordinating with FEMA Debris Specialist, if the QAS is assigned this responsibility



QAS personnel report to the Resident Engineer or his/her designee. Resident Engineers are responsible for ensuring effective and efficient operation of the Emergency Field Office. This includes safety, personnel management, fiscal management, and workload management responsibilities.



### ▶ 1.4 Debris Eligibility

Debris eligibility requirements as prescribed in FEMA's Public Assistance Program:

1. Eliminate immediate threats to lives, public health, and safety.
2. Eliminate immediate threats of significant damage to improved public or private property.
3. Ensure economic recovery of the affected community to benefit the community at large.

NOTE: Debris removal from private property is generally not eligible because it is the responsibility of the individual property owner. If property owners move the disaster-related debris to a public Right of Way, it then becomes eligible for pickup and disposal.



## ▶ 1.5 Quality Assurance Personnel and Integrity

– A few DOs and DON'Ts

**DO**



- Maintain an “arm’s length” relationship with contractor personnel.
- Report all instances of suspected waste, fraud, and abuse.
- Question instructions given that differ from those issued by supervisory personnel.
- Conduct all activities in a businesslike manner, and remember that the public’s eyes are watching.
- Treat all contractor personnel and crews the same.
- Treat all personnel – contractor, the USACE or public – in the manner personally expected.



**DON'T**

- Accept gifts from contractor personnel, no matter how trivial.
- Record any work that has not been performed on load tickets.
- Leave assigned area(s) of responsibility without supervisory approval.
- Play favorites with contractor crews and personnel.
- Agree to allow unauthorized USACE Mission Assignment work without supervisory approval.
- Become argumentative or confrontational with contractors, FEMA representatives, or members of the public.





## ▶ 1.6 Internal Review

### Potential Audit Problems:

- Removal of ineligible debris
- Using choke points for issuing load tickets
- Issuing load tickets at dump sites
- No QA presence at loading sites
- Removal of truck sideboards after placarding process
- Placard forgery (changing of CY)
- Incomplete and inaccurate filling out of load tickets
- Load tickets not being controlled as accountable forms
- Load tickets not being reconciled at the end of every day
- Internal controls not established in database
- Towers not positioned to allow inspection of trucks exiting dump sites
- Debris removal from private property without an ROE
- Overloading trucks creating a safety hazard
- Tailgates not meeting contract requirements
- Dump site management not meeting contract requirements such as dust control, safety enforcement, environmental compliance, etc.
- Allowing the contractor to mix C&D debris in with vegetative debris to obtain a higher pay rate when it can be easily separated at curbside
- Allowing payment for higher mileage rates when actual road miles from loading point to disposal point do not support the higher rate
- Not requiring contractors to follow the crew schedules submitted to us

The image shows a magnifying glass held over a 'Debris Load Ticket' form. The form is from 'H&H Army Corps and Engineers'. It includes fields for 'Capacity' (c.y. or tons), 'LOADING' date, 'Classification' (Residential, Construction & Demolition, H&W, or Other), 'Inspector' name and initials, 'DROP' time (a.m. or p.m.), 'Dump' location, and 'Load' (c.y. or tons). There are also checkboxes for 'Inspected' and 'Time Arrived'. The form number 'H- 2543' is visible at the bottom right.



## ▶ 1.7 Supervisor's Expectations

- Work SAFELY and require others to work SAFELY.
- Follow all policies, procedures, and instructions.
- If something is unclear, ask questions.
- If something is wrong, incorrect, illegal, unethical, etc., report it.
- If it is necessary to leave your assigned area, let your supervisor know.
- Be on time and do not leave early.
- Report to work with adequate drinking water, snacks, medications, Personal Protective Equipment (PPE), load ticket books and other provisions you may require.
- Write legibly on reports, load tickets, etc.
- Treat fellow workers, contractors, and the public respectfully.
- Set an example for others by always wearing Personal Protective Equipment and supporting safe work practices.
- Do not become argumentative or disrespectful to anyone. Call your supervisor to deal with controversial situations.
- Time your lunch and breaks to prevent delaying the issuing of load tickets.



## 2 Safety

### ▶ 2.1 Debris Operations

Debris management operations are inherently hazardous for many reasons:

- Work areas are often isolated environments.
- Heavy and often extremely loud equipment may be operating.
- Extreme weather conditions may exist.
- Exposure to snakes, insects, and other hazardous organisms may occur when debris piles are disturbed.
- Glass, nails, and rusted metal objects may be scattered throughout the area.
- Work is often in areas where children are playing nearby.



## ▶ 2.2 Self Preparation

Before reporting to assigned field location(s), take a moment to make preparations to ensure safety. The following is a short checklist:

- Weather-appropriate clothing such as warm, dry clothes and rain gear
- Protective footwear (safety-toed boots)
- Minimum long pants, short-sleeved shirt
- Eye and ear protection
- Hardhat
- Gloves
- High Visibility Apparel (required if working around traffic, at night, or as identified in the AHA/PHA provided)
- Respiratory protection
- Sunscreen and lip balm
- Insect repellent
- Personal medications and prescription drugs
- Adequate drinking water, snacks, and lunch
- Cell phone and extra batteries
- Hand sanitizer
- Maps
- Accident reporting forms
- First aid kit(s)



Your medical screening should be up to date and recorded in ENGLink. You must have current vaccinations (Tetanus, Hepatitis B, etc.).

The contractor is required to wear safety equipment as well.



### ▶ 2.3 Debris Loading Safety

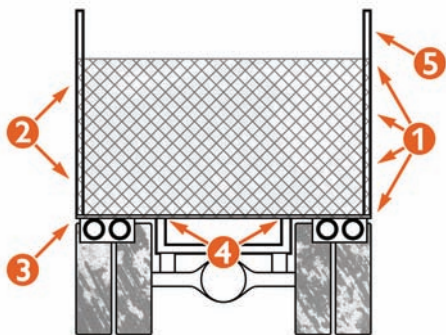
Safety considerations to watch for:

- Check the area for potential safety hazards such as downed power lines.
- Check for children playing in the area.
- Keep the work zone clear of unauthorized observers, children, and pedestrian traffic.
- Are traffic control needs met?
- Are trucks and equipment being operated safely?
- Are trucks being loaded completely and safely trimmed of protruding debris that may be a hazard before being allowed to leave the loading zone?
- Perform a pre-work inspection to check debris piles to identify covered utility meters, transformers, hydrants, mail boxes, etc., to help prevent damage from loading equipment and find potential problems.
- Understand and maintain the operating and safety clearances for all heavy equipment onsite.
- Watch for overhead power lines.
- Do not park your vehicle in the work zone, because it adds to congestion.



## Tailgate Fencing

- 1 Attach the fencing permanently to one side of the truck bed.
- 2 After loading, tie the fencing to the other side of the truck bed at two places with heavy cage wire.
- 3 Fencing must extend to the bottom of the bed.
- 4 After loading, the bottom of the fencing should be tight against the bed of the truck and secured at a minimum of two locations.
- 5 Use solid iron metal bars on two sides of the fencing.



## Checklist for Inspecting Loaded Trucks Before Leaving Loading Site

### **“SAFE THE LOAD”**

- Is the load trimmed of protruding debris?
- Is the tailgate functional and fastened securely?
- Is anyone standing on running boards or too near the truck?
- Has traffic been stopped to allow the truck to enter the travel lane?



## ▶ 2.4 Traffic Control Safety

The art of traffic control is a difficult one to master. The contractor must present his work zone set-ups via diagram and use as a training tool. Training must occur initially and as needed.



Some key points to know and learn:

- Learn proper work zone set-up and enforce it. (Use diagrams provided during your orientation. Work zone set-up must be in accordance with Manual on Uniform Traffic Control Devices (MUTCD) and applicable State.)
- Flagging is a very important and demanding job. Flaggers protect the workers and the traveling public. They must be trained and understand what they are doing, how to do it, and WHY they are doing it.
- Flaggers must be stationed on the shoulder to avoid traffic. They should NEVER be in the travel lane.
- Flaggers must have the proper equipment (paddles, flags, signs, PPE, communication, etc.).
- Ensure sight distance is long enough to allow drivers time to see and react.
- Flaggers must maintain eye contact with the traffic.
- Flaggers should be alert and pay attention to the TRAFFIC.
- Traffic signage and work zone set-ups differ depending on the type of road and speed limit, as well as terrain considerations. QAs do not determine how to set up, but they must enforce and QA the set-up.
- All work MUST occur in the work zone, between the flaggers.

The QA assures that the contractor's work zone set-ups and traffic control are appropriate and effective.





## ▶ 2.5 Disposal Site Safety

### Towers

- Erect and anchor towers properly and provide them with a safe means of access.
- Towers should have adequate fall protection via guardrails, handrails, walls, etc.
- Place barricades to protect the towers from traffic.
- Ensure the towers are located in the best possible position.
- Ensure the towers are provided with adequate weather protection and screening material to block the sun.
- Make restrooms available to the tower QA personnel.
- Provide a reliable means of communication to tower personnel.
- Provide all tower personnel with proper PPE.
- Flagmen/spotters should be in place by the landfill to ensure smooth, safe traffic flow. These personnel should be provided appropriate PPE (high visibility vests, hard hats, safety shoes, etc.).
- Keep access roads adequately wet to minimize airborne dust levels.
- Ensure that tower personnel know what to do and whom to call in case of accidents or emergencies.
- Dump sites should be as level and firm as possible.
- If incinerators or grinders are being used to reduce the debris, ensure these areas are properly secured and accessible only to authorized personnel.
- All personnel should wear hearing protection when exposed to high noise levels.

### Other Considerations

- If you perceive unsafe weather conditions, contact the QAS.
- Notify the QAS if sanitary hand-washing facilities are unavailable.
- Personal Protective Equipment (PPE) includes sunscreen, bug spray, hand sanitizer, plenty of fluids, safety shoes, hard hats, high visibility vests (if out and among the traffic on site), hearing protection, and respirators as needed.





### 3 Public Right of Way (ROW) Debris Removal

#### ▶ 3.1 General Guidelines for Public Property

In general, debris on public property must be removed to allow continued safe operation of governmental functions. Therefore, it is eligible under one of the first two criteria listed in section 1.1. However, not all public property clearance is necessarily eligible. Debris blocking streets and highways is a threat to Public Health and Safety because it blocks passage of emergency vehicles or it blocks access to emergency facilities such as hospitals. Debris in a stream or flood channel may cause flooding from a future storm. If such flooding would cause an immediate threat of damage to improved property, the debris may be eligible for removal only to the extent necessary to protect against an event that could reasonably be expected to occur on the average of once every five years. Removal of fallen trees in a forested or wilderness area is usually ineligible.



3 Public Right of Way





### ▶ 3.2 ROW – What is it?

Public Rights of Way are often difficult to locate without a survey. For the purposes of debris removal operations we identify eligible Rights of Way as:

- The area adjacent to public streets and roads where mowing is performed by the Local government
- The area adjacent to public streets and roads, between the road edge and the utility poles
- Areas identified by the QAS and the RE as eligible

Debris piles on the public ROW and extending beyond the public ROW onto private property may be removed, if possible, without placing equipment on private property. The equipment must be able to reach over onto the private property to remove the debris.

Debris may be cleared from roads and highways, including the travel lanes and shoulders, roadside ditches and drainage structures, and the maintained Right of Way.






### ▶ 3.3 Sorting Debris at Curbside or Roadside



#### "WHAT DO I DO WITH ALL THIS DEBRIS?"

Separating debris into piles of vegetative debris, construction and demolition (C&D) debris, household hazardous waste (HHW), and ineligible debris such as household garbage is best accomplished at the curbside before being loaded. Sorting debris at the processing, storage, or disposal site is usually ineffective and inefficient.

- If C&D debris cannot be separated from vegetative debris before loading, then it is loaded and hauled as C&D debris.
  - C&D materials from minor or major repairs or reconstruction (of private property) by contractors should not be deposited at the curbside. The contractors performing the private property work should remove this debris. It is not eligible for removal. **Leave it!**
  - Household garbage is not eligible for removal. **Leave it!**
  - In most disasters, debris from unimproved property is not eligible. Leave it, unless given specific, written, supervisory instructions to remove it.
  - Usually, authorization is given to have equipment reach onto private property to remove debris piled adjacent to the ROW. Without specific supervisory approval, don't allow equipment onto private property to push or prepare piles for loading.
  - Debris from commercial properties is not normally eligible. **Leave it!**
  - Crews working vegetative and C&D debris should not move items such as refrigerators and freezers with food inside. Special permission and handling are needed for these and other "white goods."
- 




### ▶ 3.4 Good Actions for Right of Way (ROW) Quality Assurance

- Inspect conditions ahead of crews for unsafe situations such as downed power lines, washed-out roads, leaning trees, etc.
  - **STAY CLEAR OF ALL POWER LINES!** – Report downed lines to the utility company and keep the phone number handy.
- Inspect conditions ahead of crews. Document damages that exist before crew arrival.
- Identify fire hydrants, water meters, and utility pedestals before the crew arrives and point them out to the foreman or Quality Control person.
- Be alert for propane tanks and fuel tanks possibly containing flammables. Do not handle these. Report them to the QAS.
- Progress from site to site in an orderly process without jumping around to larger piles of debris.
- Stay alert to ensure only eligible debris is being taken. Call the QAS if you are uncertain!
- **NEVER** sniff the contents of a tank or drum to identify the contents.
  - **TREAT ALL CONTENTS AS HAZARDOUS.** –
- Document everything in the daily report. Include photographs if necessary.





### ▶ 3.5 Ten Safety Offenses to Watch For

1. Equipment working within 10 feet of electrical lines  
**FIX** Stop work and have the equipment moved. Call the supervisor if the offense continues.
  2. Equipment without audible backup alarms  
**FIX** Stop the piece of equipment from working until repaired. Notify the supervisor and the contractor's QC person.
  3. Traffic flaggers not performing their duties or missing from their assigned work area  
**FIX** Stop work, contact the contractor's QC for immediate correction and do not issue load tickets until corrected.
  4. Trucks backing up without a spotter  
**FIX** Stop work and contact the contractor's QC.
  5. Workers on foot walking around working equipment and under raised buckets or booms  
**FIX** Stop work and contact the contractor's QC.
  6. Workers performing maintenance on raised buckets or booms without appropriate blocking or cribbing  
**FIX** Stop work and contact the contractor's QC.
  7. Workers on running boards or riding on equipment while moving  
**FIX** Stop work and contact the contractor's QC.
  8. Workers in raised buckets of loaders  
**FIX** Stop work and contact the contractor's QC.
  9. Workers transported in beds of trucks  
**FIX** Stop work and contact contractor's QC.
  10. Workers walking on top of debris loads in trailers or truck beds  
**FIX** Stop work and contact the contractor's QC.
- 

# PICKING UP THE PIECES

Following these specific guidelines when hauling hurricane-related debris and household garbage to the curb will make for a speedier removal process

Reprinted with permission from The Times-Picayune

**CORRECT WAY**

Homeowners are being asked to separate debris into the following categories:

- 1 HOUSEHOLD GARBAGE**
  - ▶ Bagged trash
  - ▶ Discarded food
  - ▶ Packaging, papers
  - ▶ All garbage should be placed curbside the night before the scheduled weekly pickup.
- 2 CONSTRUCTION DEBRIS**
  - ▶ Building materials
  - ▶ Drywall
  - ▶ Lumber
  - ▶ Carpet
  - ▶ Furniture
  - ▶ Mattresses
  - ▶ Plumbing
- 3 VEGETATION DEBRIS**
  - ▶ Tree branches
  - ▶ Leaves
  - ▶ Logs
- 4 HOUSEHOLD HAZARDOUS WASTE**
  - ▶ Oils
  - ▶ Batteries
  - ▶ Pesticides
  - ▶ Paints
  - ▶ Cleaning supplies
  - ▶ Compressed gas
- 5 WHITE GOODS**
  - ▶ Refrigerators
  - ▶ Washers, dryers
  - ▶ Freezers
  - ▶ Air conditioners
  - ▶ Stoves
  - ▶ Water heaters
  - ▶ Dishwashers
- 6 ELECTRONICS**
  - ▶ Televisions
  - ▶ Computers
  - ▶ Radios
  - ▶ Stereos
  - ▶ DVD players
  - ▶ Telephones

**WRONG WAY**

**GROSSING THE LINE**

- ▶ Any debris placed from the sidewalk toward your property will not be picked up. Contractors cannot collect items on private property.

**PROPPING UP**

- ▶ Do not set debris against trees or poles. Doing so makes it harder for cleanup crews to scoop up the items.

**HELPFUL HINTS**

- A** Limit curbside garbage to two 32-gallon containers or eight trash bags
- B** Share piles with neighbors
- C** Refrigerator and freezer doors must be secured with duct tape

Source: Army Corps of Engineers debris removal contractor  
STAFF GRAPHIC BY LANA SWENSON  
The Times-Picayune

NOTE: This graphic was created to give homeowners an understanding of the debris removal process. Though it was not designed to aid Corps of Engineers personnel, QAs may still find it useful in explaining procedures and regulations to contractors.

## 4 Environmental Compliance

Household hazardous waste (HHW) should be identified at curbside to the maximum extent possible and segregated from the vegetative and C&D debris.



The following is a list and description of potential HHW that may be encountered at curbside or at any debris deposition site. **NOTE:** This is not an exhaustive list:

- Batteries
- Fluorescent light bulbs
- Televisions, computer CRT monitors, and microwaves
- Paints, solvents, paint thinners, industrial cleaners, etc.
- Gasoline
- Oil and oil filters
- Gas cylinders (propane tanks, acetylene tanks, refrigerant containers, etc.)
- Lawnmowers
- Electrical transformers and light ballasts
- Medical wastes
- Explosives (ordnance, fireworks, black powder, ammunition, etc.)
- Fertilizers and pesticides
- Containers of any shape labeled with the following descriptive words:  
**Caution – Toxic – Danger – Flammable – Warning – Corrosive  
Explosive – Reactive – Radioactive – Combustible – Biohazard  
Poisonous – Hazardous**



QAs will make diligent efforts to identify and require the contractor to segregate HHW at curbside from the vegetative and C&D debris. QAs are not to dig through piles of vegetative and C&D debris looking for HHW. Normally tires are not considered eligible storm debris and should not be loaded with debris.

All debris removal and disposal activities must be in compliance with Local, State, and Federal environmental and historic preservation laws and regulations. Noncompliance may result in a loss of FEMA assistance as well as citations from the appropriate regulatory agency.

Examples of debris activities that may have environmental or historic preservation considerations include:

- Debris removal at a historic site – the applicant may be required to hand-remove certain debris instead of using heavy equipment
- Expanding the limits of a debris management site into a wetland area or other environmentally sensitive area
- Encroachment on historic properties
- Work within archeological sites
- Activities that trigger Environmental Justice considerations
- Disposal of potentially hazardous materials (e.g., oil, fuels)
- Work within areas of threatened and/or endangered species





## 5. Leaners, Hangers, and Stumps

### “THE BIG THREE”

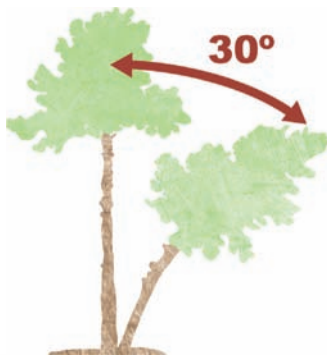
In general, the removal of tree limbs and other components that have completely broken from the tree or have fallen into public space and now pose an immediate threat is eligible for FEMA assistance. However, the removal of trees with broken limbs, remaining stumps, or dead trees is not always eligible for assistance.

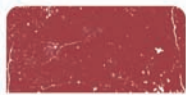
#### ▶ 5.1 Hazardous Trees and Limbs

Trees and limbs may be eligible for removal if they are on public property within or adjacent to improved or publicly-used space or on private property that meets the criteria of posing an immediate threat.

Examples include:

- Trees alongside public roadways
- Trees within a naturalized, maintained area of public parks or golf courses
- Trees within private property are usually only eligible if they are a threat to public property. (If they are a risk to only a private residence, they are not normally eligible.)
- Trees leaning 30 degrees or more





Hazardous trees that pose an immediate threat to a location near or within a public use area are generally eligible for removal.

Normally, trees requiring removal are flush cut to the ground.



In public use areas, this tree **MUST** be removed. The branches have broken beyond the branch protection zone and into the heartwood. This tree is not structurally sound.



This tree **DOES NOT** need to be removed. It only needs the broken, hazardous limbs removed.

**Examples of hazardous tree conditions include:**

- Trees that are unstable and leaning into the areas used by the public
- A tree with more than 50 percent of the tree crown destroyed or damaged
- A tree with a split trunk or broken branches that expose the heartwood
- A tree that has fallen or is uprooted



If more than **50%** of the tree crown is destroyed or will be removed when all hazardous limbs are removed, then the tree should be removed.





If an applicant chooses to save a tree in a hazardous condition then the applicant is responsible for the related expenses.

If a property owner cuts up a disaster-damaged tree on his or her property and pushes it to the curb, then the removal of the tree from the curbside would be eligible. This would be limited to improved areas and does not include large wooded lots, agricultural areas, or similar tracts of land.

Hazardous limbs may be eligible for removal. If a broken limb (two inches or greater in diameter) is still hanging in a tree but is threatening a public-use area, such as a walkway, sidewalk, road, golf cart path, or other improved and maintained property, it is eligible for removal.

Conditions that are ineligible for FEMA assistance include:

- Removal of a tree if only limb damage has occurred
- Maintenance trimming
- Removal of fallen trees in a forested or wilderness area
- Removal of trees from subdivisions under development or off the Right of Way in rural areas

### **Broken Trees**

- If a broken tree is on public property, then eligibility is limited to cutting the trunk at ground level and removing the debris.
- If a broken tree is on private property, then its removal is typically the responsibility of the property owner.
- Note that if a tree has fallen from a public area onto private property, then only the part remaining on public property would be eligible for removal.





Dead trees are only eligible when they meet the general eligibility criteria for trees and limbs that pose an immediate threat, and the tree condition is a result of the declared event.

However, applicants may be encountered who want to remove dead trees as part of the disaster debris removal. Note that, in most cases, trees probably did not die as a result of the disaster (unless it burned as a result of the disaster). Therefore, its removal would not be eligible unless it is demonstrated that it poses an immediate threat. The fact that a tree may die, or is dead, does not necessarily make it eligible for FEMA assistance. Follow the guidelines outlined by FEMA.

### Leaning Trees on the ROW

- A hazardous tree on the ROW leaning toward private property that cannot be removed safely without damaging private property must be referred to the QAS for a decision.
- Any tree leaning more than 30° is considered a leaner.
- Remove trees leaning towards the road and on the ROW.
- Trees may need chainsaw work to bring down.
- Do not enter property without a ROE.



### ▶ 5.2 Stumps

Stumps (larger than 24 inches in diameter) extracted from the public ROW of improved public property may be eligible for payment on a cubic yard rate based on the following FEMA Stump Conversion Table. Any stump, regardless of size, that was uprooted by the disaster event and placed on the public ROW by adjacent property owners, may be eligible for payment at the vegetative debris cubic yard rate if it poses an immediate threat to life, public health, and safety.



## Stump Conversion Table – Diameter to Volume Capacity

The quantification of the cubic yards of debris for each size of stump in the following table was derived from FEMA field studies conducted throughout the State of Florida during the debris removal operations following Hurricane Charley, Frances, Ivan and Jeanne. The following formula is used to derive cubic yards:

$$\frac{[(\text{Stump Diameter}^2 \times 0.7854) \times \text{Stump Length}] + [(\text{Root Ball Diameter}^2 \times 0.7854) \times \text{Root Ball Height}]}{46656}$$

0.7854 is one-fourth Pi and is a constant.

46656 is used to convert inches to Cubic Yards and is a constant.

The formula used to calculate the cubic yardage used the following factors, based on findings in the field:

- Stump diameter measured two feet up from the ground
- Stump diameter to root ball diameter ratio of 1:3.6

Stump Diameter (Inches)	Cubic Yards	Stump Diameter (Inches)	Cubic Yards	Stump Diameter (Inches)	Cubic Yards	Stump Diameter (Inches)	Cubic Yards	Stump Diameter (Inches)	Cubic Yards	Stump Diameter (Inches)	Cubic Yards
6	0.3	19	2.6	32	7.3	45	14.5	58	24.1	71	36.1
7	0.4	20	2.9	33	7.8	46	15.2	59	24.9	72	37.2
8	0.5	21	3.2	34	8.3	47	15.8	60	25.8	73	38.2
9	0.6	22	3.5	35	8.8	48	16.5	61	26.7	74	39.2
10	0.7	23	3.8	36	9.3	49	17.2	62	27.6	75	40.3
11	0.9	24	4.1	37	9.8	50	17.9	63	28.4	76	41.4
12	1	25	4.5	38	10.3	51	18.6	64	29.4	77	42.5
13	1.2	26	4.8	39	10.9	52	19.4	65	30.3	78	43.6
14	1.4	27	5.2	40	11.5	53	20.1	66	31.2	79	44.7
15	1.6	28	5.6	41	12	54	20.9	67	32.2	80	45.9
16	1.8	29	6	42	12.6	55	21.7	68	33.1	81	47
17	2.1	30	6.5	43	13.3	56	22.5	69	34.1	82	48.2
18	2.3	31	6.9	44	13.9	57	23.3	70	35.1	83	49.4

To convert volume from cubic feet to cubic yards, multiply cubic feet by 0.03704.





The following information was taken from FEMA Policy Guidance pertaining to stump eligibility. USACE debris removal work must comply with this and other FEMA eligibility policy:

“When a disaster event uproots a tree (i.e. 50 percent of root ball is exposed) on a public right-of-way, improved public property or improved property owned by certain private nonprofit organizations and the exposed root ball poses an immediate threat to life, public health and safety, FEMA may provide supplemental assistance to extract, remove and dispose of the eligible stump and root ball and filling of the root cavity. FEMA will reimburse applicants reasonable costs for extracting, transporting and disposing of eligible stumps and root balls that FEMA, the State and applicant approve in advance using the attached Hazardous Stump Worksheet. FEMA will reimburse applicants for eligible stumps on a per stump basis for stumps larger than 24 inches in diameter (measured two feet from the ground). This recognizes that different equipment may be required to extract, transport and dispose of these sizes of stumps. Stumps with diameters of 24 inches and smaller do not require special equipment to extract, transport, and dispose of. Therefore, FEMA will reimburse applicant stumps with diameters of 24 inches and smaller at the unit cost rate for regular debris using the attached Stump Conversion Table. FEMA will not reimburse applicants for stumps and root balls that were not approved in advance.

“FEMA will reimburse applicants at the unit cost rate (usually cubic yards) for normal debris removal for all stumps, regardless of size, that are placed on the rights-of-way by others (i.e. contractors did not extract them from public property or property of eligible Private Non Profit organization).







“In these instances, applicants do not incur additional cost to remove these stumps – the same equipment is used to pick up “regular” debris can be used to pick up these stumps. If an applicant believes that it will incur additional costs in removing large stumps from the rights-of-way, it should complete the Hazardous Stump Worksheet and present documentation to FEMA in advance for approval.

“FEMA does not consider stumps with less than 50 percent of their root ball exposed to be hazardous. Therefore, the removal of these stumps is not eligible for reimbursement. FEMA will reimburse applicants the cost to cut the stump at ground level.”

### **NOTE**






All stump measurements should be made two feet up from the original ground level. It may be necessary to make several measurements and determine the average of the measurements to determine a fair diameter. If the stump is cut lower than two feet or is split, reconstruct the taper of the trunk using similar trees in the nearby area to estimate the diameter at two feet.



### **INELIGIBLE STUMPS**

Stumps that were extracted or picked up from ineligible locations, such as unimproved public or private property, are not eligible. Stumps that were removed by contractors that did not constitute an immediate threat to life, public health, and safety are not eligible. Stumps that were removed by contractors from trees that were not uprooted by the disaster event are not eligible.





## 6 Load Tickets

### ▶ 6.1 Discussion

Debris removal operations require a process for tracking progress, location, volume, type, the contractor performing the work, Quality Assurance personnel onsite, disposal site used, etc. This requirement is met by using the load ticket process. Regardless of the type of contract used (unit price, hourly, cost reimbursable, etc.), the need to collect information on each load of debris exists and is important in executing the Mission Assignment.

Load tickets are sequentially numbered, produced in multiple copies, and bound in books of 25 or more.

Key points to remember are:



- Load tickets are the “root document” used for contractor payment.
- Load tickets must be treated as “blank checks” and as accountable forms.
- Load tickets must be secured in all stages of their process life.
- QAs are responsible for safeguarding all load tickets they are furnished.
- If Load Tickets are lost or stolen, immediately report the event to your supervisor.

### ▶ 6.2 Load Ticketing Process

Multi-copy Load Tickets



Debris removal contracts are most often written as unit price contracts. This allows for the contractor to be paid for each unit (usually by the cubic yard or ton) and the debris hauled to the disposal site in a pre-measured and certified dump container or hauling container. The load ticket starts the process of documenting the volume and eligibility of the debris being removed.





Quality Assurance personnel originate the load ticket at the loading site. It is important for the load ticket to be filled out at the loading site to ensure the eligibility of the debris being hauled and to document the point of origin for each load of debris (by street address or lat/long coordinates).

Before issuing a load ticket, the QA person at the site must:

- Make sure the debris is eligible for removal under the FEMA guidelines for the disaster.
  - Make sure the debris loaded on the truck is trimmed of overhanging limbs, the tailgate is secure and functional, and the load is safe for transport.  
SAFE THE LOAD.
  - Make sure to write legibly and firmly on the ticket in order for all copies to be read. Use a ball point pen. Write using block letters.
  - Make sure the ticket is filled out completely.
  - Give the driver the appropriate number of tickets only after a satisfactory check of the points mentioned above.
- 
- 

The truck driver delivers the load of debris to the appropriate disposal site. The QA person, usually located in an inspection tower on an entrance road to the disposal site, is responsible for “calling the load” before the driver dumps the load. See section 7.3.



#### Electronic Ticketing

The Corps of Engineers, in partnership with FEMA, is exploring opportunities to take advantage of currently available technology to enhance the effectiveness and efficiency of the debris load accounting process. Once implemented, the new processes will dramatically change current business practices. More extensive use of electronic data management equipment will require that Quality Assurance personnel be trained in the use and care of this equipment.



## Using Load Tickets to Manage Work

One complaint common to QA personnel regards the contractor's management of the debris removal task. Because it is more profitable, contractors often "skip" around, going to larger concentrations of debris without finishing work in a systematic manner. To help ensure completion of debris removal in one area before moving to another, the QA person only needs to remain in the area to finish, and only issue tickets from that area. The contractor does not get paid without the ticket. "Go Figure!"

**✓ LEGIBLE**

		<b>Debris Load Ticket</b>
US Army Corps of Engineers		
Contractor: <u>PJ</u>		
Contractor No. <u>DACW015737P</u>		
Driver: <u>Pierce</u> Truck No. <u>27</u>		
Truck Capacity <input checked="" type="checkbox"/> c.y. <input type="checkbox"/> tons <u>20</u>		
<b>LOADING</b> Date: <u>7/20/05</u>		
Location: <u>110355 S+</u>		
<b>Load Classification:</b>		
<input checked="" type="checkbox"/> Vegetative <input type="checkbox"/> Construction & Demolition		
<input type="checkbox"/> Mixed <input type="checkbox"/> HHW <input type="checkbox"/> White Metals		
<input type="checkbox"/> Other		
<b>Distance to Drop Off Point</b>		
<input checked="" type="checkbox"/> >0-15 miles <input type="checkbox"/> >15-30 <input type="checkbox"/> >30-60		
<input type="checkbox"/> Other		
<Time Released		
<u>0850</u> <input checked="" type="checkbox"/> a.m. <input type="checkbox"/> p.m.		
Inspector: _____		
<b>DROP OFF</b> <Time Arrived		
<u>0918</u> <input checked="" type="checkbox"/> a.m. <input type="checkbox"/> p.m.		
Dumpsite: <u>Fairgrounds</u>		
Load Amt: <input checked="" type="checkbox"/> c.y. <input type="checkbox"/> tons > <u>18</u>		
Inspector: <u>W. [Signature]</u>		
<small>           Dig Yellow Prime Contractor Green            USACE Driver Other            * Accountable Document *         </small>		
 Ticket Number: <b>H- 2543</b>		

**✗ ILLEGIBLE**

		<b>Debris Load Ticket</b>
US Army Corps of Engineers		
Contractor: <u>BS</u>		
Contractor No. <u>DLW0087</u>		
Driver: <u>Boice</u> Truck No. <u>27</u>		
Truck Capacity <input checked="" type="checkbox"/> c.y. <input type="checkbox"/> tons <u>20</u>		
<b>LOADING</b> Date: <u>7/20/05</u>		
Location: _____		
<b>Load Classification:</b>		
<input type="checkbox"/> Vegetative <input type="checkbox"/> Construction & Demolition		
<input type="checkbox"/> Mixed <input type="checkbox"/> HHW <input type="checkbox"/> White Metals		
<input type="checkbox"/> Other		
<b>Distance to Drop Off Point</b>		
<input type="checkbox"/> >0-15 miles <input type="checkbox"/> >15-30 <input type="checkbox"/> >30-60		
<input type="checkbox"/> Other		
<Time Released		
<u>0850</u> <input checked="" type="checkbox"/> a.m. <input type="checkbox"/> p.m.		
Inspector: _____		
<b>DROP OFF</b> <Time Arrived		
<u>0918</u> <input checked="" type="checkbox"/> a.m. <input type="checkbox"/> p.m.		
Dumpsite: <u>Fairgrounds</u>		
Load Amt: <input type="checkbox"/> c.y. <input type="checkbox"/> tons > <u>18</u>		
Inspector: <u>W. [Signature]</u>		
<small>           Dig Yellow Prime Contractor Green            USACE Driver Other            * Accountable Document *         </small>		
 Ticket Number: <b>H- 2543</b>		



## 7 Disposal Site Quality Assurance

### ► 7.1 Discussion

The efficiency and effectiveness of any debris removal operation is only as good as the operation and management of the disposal sites. Simple fact – one can load only so much debris at the curbside without a place to dispose of the material. A safe and smooth running disposal operation greatly enhances the entire debris removal, reduction, and disposal process.

Often permanent disposal sites are not available at the onset of a debris removal operation. This necessitates using Temporary Debris Storage and Reduction Sites (TDSRS). In many cases, these TDSRS are used to collect debris, in some cases sort debris, and often reduce the volume of debris by recycling, grinding, chipping, or incineration. Ultimately the material must be moved to the “final resting place.”

Many important actions generally occur at the disposal site. These actions include “Calling the Load” (see section 7.3), ensuring that only debris eligible for disposal at the site is accepted, monitoring reduction operations, inspecting loads for hazardous material, and monitoring the safe operation of the site.

Disposal sites are locations of concentrated equipment traffic, often encumbered by smoke, dust, and mud. Challenges to the safe operation of the sites demand the Quality Assurance person’s constant attention. See the discussion of disposal site safety that follows.

The following paragraphs address some of the important actions and considerations for Quality Assurance personnel assigned to disposal sites.



## ▶ 7.2 Guidelines for Estimating Loads in Trucks


- Ensure that the number and capacity (size) of the truck, which is written on the load ticket, is the same as what is marked on the side of the truck.
- Make sure the truck is loaded with disaster debris.
- All loads must be viewed from a tower or other suitable and safe facility.
- Ensure the truck is empty when it leaves the disposal site.
- Trucks without tailgates CANNOT be considered full.
- If the truck is half full, note that the load is 50 percent full in the debris quantity section of the load ticket (see the diagram in section 7.3 for percentage examples of loaded trucks).
- If the truck is one quarter full, the load is 25 percent full.
- If the truck is three quarter full, the load is 75 percent full.





### ▶ 7.3 “Calling the Load”

“Calling the Load” requires the QA person to:

- Estimate the volume of material in the dump body or hauling container by estimating either the percent of full volume or the number of cubic yards of material the load is “short” of being full. **NOTE:** More tips on estimating the load volume is presented elsewhere in this guide.
  - The disposal site QA person calculates the volume hauled by taking the maximum load capacity (located on the placard on the truck and also on the load ticket, which should match) times the estimated percentage that has already been assigned, which will equal the total cubic yards on the truck. If applying the cubic yards “short” of a full load, the QA person subtracts the estimate of “short” cubic yards from the maximum load capacity.
  - Classify the type of debris delivered to the disposal site: Is the debris only vegetative debris, or only construction and demolition (C&D) debris? Is it mixed with both types? Mixed vegetative debris and C&D debris must be disposed of in the C&D disposal site.
  - Inspect the loaded debris for possible contamination by household hazardous waste, household garbage, hazardous waste, oil drums, propane containers, etc. When these types of materials are discovered follow mission-established procedures or contact the QA Supervisor for instructions before allowing the driver to dump the load.
  - If a truck driver shows up with a load and does not have a load ticket, call your QAS for guidance.
- 



“Calling the load” is like calling balls and strikes in a baseball game. Even if the job is done correctly, not everyone will be happy. The best way to minimize complaints is to call each load consistently and in a manner fair to the government and to the contractor. Whenever possible, it is good to have two QA persons working in the tower and calling each load, but this is not always possible because of staffing shortages.





If estimating loads using cubic yards “short” of a full load, consider:

- A portable toilet is approximately two cubic yards of volume.
- A 36-inch television box is approximately one cubic yard of volume.
- A cubic yard of volume measures three feet by three feet by three feet.
- Credit for load volume should be based on compacted volume free of large air voids. Visualize compacting loose material and filling air voids; then estimate the volume.
- No matter what a contractor says, there is no such thing as the “fluff factor.”

### Monitoring Tips

Some unscrupulous debris contractors use various techniques to inflate actual quantities of debris removed and processed. Be on the lookout for:

- **Inaccurate Truck Capacities** – Trucks should be measured before operations, and load capacities should be documented by truck number. Periodically, trucks should be pulled out of operation and remeasured.
- **Trucks Not Fully Loaded** – Do not accept the contention that loads are higher in the middle and if leveled would fill the truck. Check to see if that statement is valid.
- **Trucks Lightly Loaded** – Trucks arrive loaded with treetops (or a treetop) with extensive voids in the load.
- **Trucks Overloaded** – Trucks cannot receive credit for more than the measured capacity of the truck or trailer bed even if material is above the sideboards. If a truck is measured to carry 18 cubic yards it cannot receive credit for more than 18 cubic yards. However, it can receive credit for less if not fully loaded or if it is lightly loaded, as described above.





- **Changing Truck Numbers** – Normally, trucks are listed by an assigned vehicle number and capacity. There have been occasions where truck or trailer numbers that have a smaller carrying capacity have been changed. This can be detected by periodically remeasuring the trucks.
- **Reduced Truck Capacity** – There have been occasions where trucks have had a heavy steel grating welded two to three feet above the bed after being measured, thus reducing the capacity. This can be detected by periodically re-measuring the truck bed.
- **Wet Debris when Paid by Weight** – Contractors have sometimes added excessive water to debris loads to increase the weight when being paid by the ton. This can be detected during monitoring before the load reaches the disposal site by excessive water dripping from the truck bed, or by inspecting the truck bed immediately after unloading.
- **Multiple Counting of the Same Load** – Trucks have been reported driving through the disposal site without unloading completely, and then re-entering with the same load. This can be detected by observing the time of departure and time of arrival recorded on the driver's load ticket.
- **Mixing Different Types of Debris** – There have been occasions where contractors intentionally mix C&D debris in with vegetative debris to obtain the higher rate of pay for C&D debris. This is unacceptable. Whenever possible, debris should be sorted at curbside and hauled separately. If contractors insist on mixing debris, contact your QAS.
- **Removing Side Boards** – Be alert for side boards being removed after initial certification. This could be a result of damage or intentional removal in an attempt to receive credit for more debris than is being transported.







## 8

## Definitions

**Burning** Reduction of woody debris by burning in a pit or open area, as opposed to incineration in a mechanical system. Incineration is the preferred method of disposal when burning debris.

**C&D Debris** Construction and demolition debris.

**Chipping, Mulching, or Grinding** Reducing wood-related material by mechanical means into small pieces to be used as mulch or fuel. Woody debris can be reduced in volume by approximately 75 percent based on the data obtained during reduction operations. The terms “chipping” and “mulching” are often used interchangeably.

**Choke Point** A designated point away from the loading site where a QA is stationed to inspect and issue load tickets for debris hauling trucks working multiple loading sites. choke points should only be used with the Resident Engineer’s approval and only if absolutely necessary because they do not provide for QA monitoring at the loading site.

**Contractor Quality Control (CQC)** The contractor’s system to manage, control, and document his/her own and his/her subcontractor’s activities to comply with contract requirements.



- Debris** Scattered items and materials broken, destroyed, or displaced by a natural disaster. Examples include trees, construction and demolition material, and personal property.
- Debris Clearance** Clearing the major road arteries by pushing debris to the roadside to accommodate emergency traffic.
- Debris Management Site (DMS)** A location for temporary storage and/or reduction, recycling, and segregation before final disposal. Also see Temporary Debris Storage and Reduction (TDSR) site.
- Debris Removal** Picking up debris and taking it to a temporary storage site or permanent landfill.
- Electronic Debris (E-Debris)** Disaster-generated debris consisting of televisions, computers, microwaves, stereos, VCRs, DVD players, and other such electronic circuit board-containing devices.
- Final Debris Disposal** Placing mixed debris and/or residue from volume reduction operations into an approved landfill.
- Fluff Factor** Does not exist. This is a term sometimes used by contractors in an attempt to achieve 100 percent load capacity by citing the expansive nature of some debris.





**Garbage** Waste that is regularly picked up by the Department of Solid Waste Management. Examples include food, plastics, and wrapping papers.

**Hazardous Waste** Material and products from institutional, commercial, recreational, industrial, and agricultural sources that contain certain chemicals with one or more of the following characteristics, as defined by the USEPA: 1) Toxic; 2) Flammable; 3) Corrosive; and/or 4) Reactive.

**Hot Spots** Illegal dump sites that may pose health and safety threats.

**Household Hazardous Waste (HHW)** Used or leftover contents of consumer products that contain chemicals with one or more of the following characteristics, as defined by the USEPA: 1) Toxic; 2) Flammable; 3) Corrosive; and/or 4) Reactive. Examples of HHW include small quantities of normal household cleaning and maintenance products, latex and oil-based paint, cleaning solvents, gasoline, oils, swimming pool chemicals, pesticides, and propane gas cylinders.

**Incineration** Reduction of woody debris by controlled burning in a mechanical system. Woody debris can be reduced in volume by approximately 95 percent through incineration. Air curtain burners are recommended because they can be operated in a manner to comply with clean-air standards.





**Mixed Load** A load of debris that contains more than one classification of debris. For example, a load of debris containing both vegetative debris and C&D debris. Loads should not be intentionally mixed for the purpose of obtaining payment for the higher value classification of debris.

**Monitoring** Actions taken to ensure that a contractor complies with the contract scope of work.

**Quality** Conformance to properly-developed requirements. In the case of debris contracts, these requirements are established by the contract specifications, the contractor's proposal, and the contractor's Quality Control Plan.

**Quality Assurance (QA) Personnel** Team members responsible for ensuring Quality Management for debris removal projects and the implementation of the Quality Assurance Program for the contract work.

**Quality Assurance Supervisor (QAS)** Team member responsible for directing and supervising Quality Assurance (QA) personnel and managing field implementation of the Quality Assurance Program.

**Quality Management (QM)** All control and assurance activities instituted to achieve the quality established by the contract requirements.

**Recycling** The recovery and reuse of metals, soils, and construction materials that may have a residual monetary value.





**Rights-of-Way** The portions of land over which facilities, such as highways, railroads, or power lines are built. It includes land on both sides of the highway up to the private property line.

**Scale/Weigh Station** A scale used to weigh trucks as they enter and leave a landfill. The difference in weight determines the tonnage dumped, and a tipping fee is charged accordingly. It also may be used to determine the quantity of debris.

**Sweeps** The number of times a contractor picked up and hauled. Passes through a community to collect all disaster-related debris from the Rights of Way. Usually limited to two to three passes through the community.

**Temporary Debris Storage and Reduction (TDSR) Site** A location where debris is temporarily stored until it is sorted, processed, and reduced in volume and/or taken to a permanent landfill.

**Tipping Fee** A fee based on weight or volume of debris dumped that is charged by landfills or other waste management facilities to cover their operating and maintenance costs.

**Trash** Non-disaster-related yard waste, white metals, or household furnishings placed on the curbside for pickup by local solid waste management personnel. Not synonymous with garbage.





**Volume Reduction Operations** Any of several processes used to reduce the volume of debris brought to a temporary debris storage and reduction site. It includes chipping and mulching of woody debris, shredding and baling of metals, air curtain burning, and similar processes.

**White Metals or White Goods** Household appliances, such as refrigerators, freezers, stoves, washers, dryers, hot water heaters, and AC units.





# Notes

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